Examples

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Suburban Arterial SR 99 in the City of SeaTac

The City of SeaTac is often considered to be WSDOT first attempt to use the philosophy of context sensitive design. While the project was considered a success for its final aesthetic appeal it became a learning opportunity for both WSDOT and its city counter parts. The issue of clear zone and sight distance was a primary discussion issue on this project because of the 45 mph speed limit.

Sea-Tac challenged the notion that designs could in fact allow for a treed environment and still be considered reasonably safe. The issue of trade-offs became paramount to the discussion. It was argued that trees allowed for a design which would reduce access points and angle accidents, and provide benefit to the pedestrian. In addition, the proposed designed was intended to provide aesthetic, environmental, and economic benefit to the city.

Early results indicate that trees placed in very narrow medians (6´ or less) were struck at unacceptable rates. This led to new landscaping design for these medians in phases 3 and 4 of the corridor project. These designs have been met with praise for vegetation use and reduction of objects in the clear zone. Interestingly, crime rates through the area have dropped.

Suburban Arterial SR 99 in the City of Des Moines

The project goals were improving traffic congestion, operations, and safety; providing facilities for transit and pedestrians; and encouraging economic redevelopment along the SR 99 corridor through the city of Des Moines. The existing roadway was an undivided five-lane facility with a two-way left-turn lane (TWLTL) and paved shoulders with minimal access control.

The project required extensive effort from all parties to achieve a successful final product. A number of public meetings was held to ensure the project would meet the defined objectives and yet be completed on time and within budget.

A High Occupancy Vehicle and Business Access lane was added in each direction of the route. Also included were bus pullouts and new transit shelters. Pedestrian features included sidewalks on both sides of the highway, new street and sidewalk lighting, mid-block pedestrian uplighting, and a pedestrian-activated signal. One of the specific features that was included in this project is a landscaped median that eliminates the existing two-way left-turn lane. The median is installed to improve both pedestrian and vehicular safety. A low profile concrete barrier protects the treed median. Gateway treatments were constructed at either end of the project.

Context Sensitive Solutions

Understanding Flexibility in Highway Design

January 2005

The Philosophy of Context Sensitive Practices

Whatever name is chosen to define context sensitive design (CSD), the vision remains the same. CSD provides a project that meets the purpose and need as defined by all project partners. It allows for the development of a project that remains a safe and efficient facility for its users and community. The project adds to the livability of the community because it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area. The WSDOT ***Context Sensitive Solutions Executive Order E 1028.00***, can be found at: http://www.wsdot.wa.gov/docs/OperatingRules Procedures/1028.pdf.

To accomplish a vision of context sensitive design requires an understanding of community values and the tools to help achieve those values by project managers, highway engineers, architects, environmental managers, public involvement personnel, and senior and executive level managers and administrators.

WSDOT tools have been developed to foster this under-standing among the different level of designers and decision makers. This document discusses these tools and provides examples for different contexts and road environments.

WSDOT is exploring sub-classifications of the functional class system which will allow designers to consider the context in which the road is being developed in addition to the functional class. Accordingly, WSDOT developed a urban design manual supplement for its managed access facilities to allow for more flexibility in design as an everyday part of doing business.

"I am impressed by the time, dedication and concern of the Washington State Department of Transportation, which has been sensitive to the historical and aesthetic concerns of the those of us who often travel that road and love the beauty of the area. I think this concern for safety, while acknowledging the importance of history and aesthetic, is impressive and I am grateful the 'easy solution' was not considered 'good enough'."

Excerpt from a letter of a historian, author and member of the Daughters of the Pioneers of Washington on Deception Pass Design Efforts.

Washington State Department of Transportation

Current WSDOT Activities

The Department has a number of activities underway to help develop a more consistent application of the context sensitive philosophy.

Interdisciplinary Group
An interdisciplinary group was formed to identify and articulate priorities, potential issues, and work elements; facilitate two-way communication; and identify task-oriented teams. Group membership includes representatives from cities within the state; Washington State Department of Community, Trade and Economic Development; Association of Washington Cities; County Road Administration Board; FHWA; Regional Planning Organization; and various WSDOT disciplines.

Context Sensitive Training
WSDOT developed context sensitive training. The training includes modules on communication techniques, conflict resolution, design options, and risk and tort liability. Training is taking place throughout the state and both WSDOT and local agency staff, are being trained.

Crash Testing Related to CSD
WSDOT has performed a number of crash test to test innovative median designs in accordance with NCHRP 350. These test have been completed on various berm slopes and treatments.

Included in this testing was 3 dimensional simulation of a crash test with a rigid 4″ object shown above. The test was performed at 42 mph. Testing provided engineers with opportunities to modify design characteristics to better collision performance. The testing also was a valuable visual aid in design discussions.

Research
A number of cities have inherited arterials that are considered by some to have undesirable characteristics as a city street. Particularly given the traffic volume, intensity of land use and level of pedestrian traffic on these higher speed principle arterials. The desire is to develop the existing arterial into a "boulevard-type" street while still maintain the highways important regional function. Proposals normally include landscaping involving the placement of trees and fixed objects in close proximity to the road.

Because little is known about the magnitude and extent of trade-offs made between models and the community in this urban context, WSDOT initiated an In-Service Evaluation of Urban Median Design. A number of recently completed projects are used as case studies for the In-Service Evaluation on several new urban median design concepts. These projects are located along SR 99, within the cities of SeaTac, Kent, Federal Way, and Des Moines. The results of the evaluation will be used to develop new urban median designs suitable for use on high-speed facilities. The research team includes the University of Washington's Transportation Center, and WSDOT and local agencies.

The analysis includes:

- Catalogue of individual median treatment features (widths)
- Accident experience before and after (changes in rates, types, locations)
- Comparison of AADT, 85th percentile speeds, and land use development
- Crime rates
- Evaluation of removal of bicycle facilities
- Public perception
- Pedestrian crossing behavior before and after at specific locations

The table below shows existing and proposed changes in cross section.

City	Existing Conditions	Proposed Changes
Federal Way Phase 1	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
Federal Way Phase 2	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
Kent Phase 1	5 lanes, TWLTL	6 lanes, turn pockets, median & shrubs
Kent Phase 2	5 lanes, TWLTL	6 lanes, turn pockets, median & shrubs
Des Moines	5 lanes, TWLTL	6 lanes, turn pockets, barrier & trees
SeaTac Phase 1	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
SeaTac Phase 2	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
SeaTac Phase 3	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
SeaTac Phase 4	5 lanes, TWLTL	6 lanes, turn pockets, median & trees
Shoreline Phase 1	5 lanes, TWLTL	6 lanes, turn pockets, median & trees

The Washington State Department of Transportation (WSDOT) is guided by a statewide vision for transportation. This vision was developed by the Washington State Transportation Commission and its statewide transportation partners. It calls for a change in the approach to transportation projects to ensure that Washington remains a desirable place to live in the future.

The Commission directs WSDOT to develop projects in rural and urban areas by working with its partners to foster multimodal transportation systems that enhance communities and to develop collaborative transportation actions sensitive to community values.

Examples

Rural Town Center US 395 in the Colville

This project has a rural town center context. The project is located in eastern Washington with highway speeds of 60 mph approaching the city and 25-35 mph through the city. The town center consists of small business throughout the core and revitalization is desirable. Freight is a major component of the traffic with the largest trucks present in high numbers. This route serves as a major artery to the town. Pedestrian safety is a concern and pedestrian volumes are moderate for a town of this nature.

The mixture of significant freight and highway traffic on Main Street with its multiple traffic lights and slower speeds created congestion, noise, and air quality concerns. Congestion made parallel parking maneuvers difficult for shoppers, which detracted from the shopper and pedestrian friendly atmosphere desirable for downtown.

To relieve congestion and improve traffic flow, the traffic signal at Main Street (US 395) and Hawthorne Road was replaced with a unique oval shaped roundabout. The Colville Roundabout provided other benefits: it decreased motorist delay, increased local traffic mobility, created an attractive gateway into the City's South entrance, and improved pedestrian safety with the provision of clearly defined crossing locations.

Rural Corridor — SR 20 Deception Pass State Park

This project is located in the Deception Pass State Park and has moderate speeds of 40-45 mph. Seasonal traffic is high with recreational use in the summer months. This location is known for its beauty and history.

In this case, preservation of historical rail was the issue. This rail was built by the Civilian Conservation Corps in 1935 and is considered a historic artifact.

The age of the components and older design do not meet today's standards, nor does the rail operate as well as is necessary for a highway of this type and volume. Currently the rail experiences on average five accidents per year. Ultimately, for reasons of future safety performance, it was agreed by WSDOT and Parks that the rail needed to be replaced. Current metal and concrete designs did not meet the historic character of the rail. WSDOT worked with parks to develop a new rail system. The proposed design maintains as many of the character defining features as possible while still retaining the ability to pass crash tests. The design retains the first 5 of 10 identified character-defining features of the historic rail, namely, rock and mortar bollard construction, bollard shape (batter, shoulders, approximate dimensions), the ability to see over and under the rail, wooden logs, and maintaining bollard spacing.

Examples

For more information:
http://www.wsdot.wa.gov/Design/Urban

Urban Interstate I-405 Corridor Wide

The I-405 Corridor is one Washington's most critical routes, serving the greater central Puget Sound Area. It is a highly congested corridor east of Seattle serving numerous cities and business. Vehicular speeds are 60 mph (high) and the corridor is built to Interstate standards in the majority of locations under its current design. Much of the route is environmentally sensitive with numerous creeks, rivers, and Lake Washington located near the corridor.

The primary focus of this corridor wide effort is to develop a context sensitive design which keeps with the natural environment. Washington, is known for its green landscapes and for this reason bridge designs include major structural elements containing green pigments. Decorative fencing will also be placed along bridge sidewalks. These will be developed to follow a scallop pattern. Walls on the project will be design with a ripple effect reminiscent of the oscillating effect seen along the surface of water bodies. Bridge piers will be patterned after the tulip flower. Street art will be included on some of the surrounding communities local streets as well as Sound Transit modal interchange locations. Extensive use of trees and native vegetation is planned throughout the corridor.

Urban Arterial SR 527 in the City of Mill Creek

This project was developed to address congestion on a section of SR 527. This route serves as the main north-south gateway to the city. Rapid commercial and residential development in and around the City of Mill Creek has strained the existing highway's capacity. The original project concept was the basis for establishing the project budget and schedule. Design elements meeting the city's criteria were added later in the process.

Large scale plots of the highway were laid out for the public to write their comments on, allowing the citizens to place their comment right where it applied, making it easier for everyone to understand the comment. This turned out to be a very effective approach and was very well received by the public.

The city and WSDOT partnered on the design of all landscaping features for both the roadside and the planted medians. The noise walls were an aspect of the design that the city was concerned could detract from the city's streetscape ideals. WSDOT's State Architect, Landscape Architect, and design team worked with the city to develop an artistic design that included a leaf pattern band along the top three feet of the noise wall panels with a "tree bark" finish below. The special "leaf relief" pattern did not add to the construction costs.

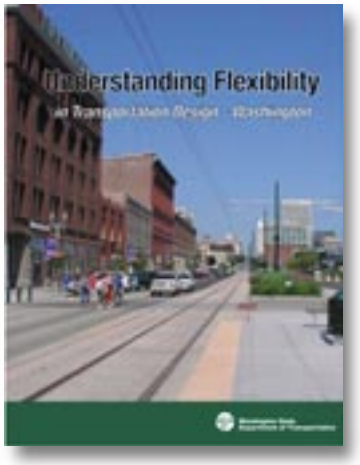
Building Project that Build Communities

To implement this context sensitive vision, WSDOT, together with a team of private, city, county, federal, and state representatives, developed a best practices guidebook, *Building Projects that Build Communities*. This document focuses on effective community-based design and collaborative decision-making. The concept of a true community partnership is good in theory, but can be difficult to put into practice, particularly when a state highway essentially serves as the "Main Street" for a community. WSDOT may be most concerned about delivering its project "on time and within budget" and place priority on maintaining mobility, traffic speeds, and safety on that stretch of the highway. The local community, however, may be equally interested in slower speeds, traffic calming devices, pedestrian access, and aesthetic enhancements to the downtown that will contribute more to community character and the local economy. The local agency may, in addition, need more lead time in developing the project to get its funding sources in place.

WSDOT, the Federal Highway Administration (FHWA), tribes, local agencies, and other partners need to understand and implement collaborative approaches that allow all stakeholders to participate equally in the vision, design, and construction of the project. At the same time, joint projects need to be implemented in a way that enables those stakeholders to achieve multiple project goals. The key is to strive for balance. Projects must be supported by sound engineering practices and, at the same time, incorporate the needs of the jurisdictions involved. The *Building Projects that Build Communities* document and the *Understanding Flexibility in Design* guides are intended to assist project teams in achieving that balance.

Understanding Flexibility in Transportation Design—Washington

Recognizing that the past design approach predominately focused toward single unit motor vehicle mobility and safety based on the concept of roadway functional class, steps were necessary to achieve design consistent with the context sensitive philosophy. WSDOT and its partners have focused on the development of additional design ideas and guidance for both urban and rural arterials as part of the document called *"Understanding Flexibility in Transportation Design—Washington"*. The document will provide conceptual guidance for the application of context sensitive design in the project development process and provide a compilation of issues that must be evaluated in highway design. The intent of the document is not to present design guidance but to be used as a tool to better understand how the different issues are interrelated and how the understanding of this interrelationship leads to better decision-making during the evaluation and optimization of trade-offs.



Understanding Flexibility in Transportation Design - Washington has been distributed for use recently. A condensed version is also being developed for senior level decision makers and elected officials to more concisely provide information in a non-technical format.

- **Division I: Introduction**, provides background information on the project development process, and the issues of liability surrounding flexibility in design.
- **Division II: Applying the Considerations**, discusses the significant and distinguishing features of a variety of contexts in which projects may be located.
- **Division III: Facility Users**, details the needs and specific considerations of the variety of users of transportation facilities.
- **Division IV: Environmental Considerations**, discusses the various environmental considerations such as urban forestry, urban streams, natural resources, cultural and historic resources, air quaility, noise, vibration, night sky darkness, and the use of recycled materials.
- **Division V: Design Considerations**, provides insight into the various design considerations during the CSD process.
- **Division VI: Project Development Approach**, covers the major elements in the project development process.